

# **Fugitive Emissions from Petroleum Refineries**

**Table I**  
**Identification of Performance Standards**  
**Source Category: Fugitive Emissions from Petroleum Refineries**

| Regulated Component            | Pollutant |  |  |  |  |  |  |
|--------------------------------|-----------|--|--|--|--|--|--|
|                                |           | BAAQMD Regulation 8-Organic Compounds, Rule 18-Equipment Leaks. 1/7/98.  |  | BAAQMD Regulation 8-Organic Compounds, Rule 28-Pressure Relief Valves at Petroleum Refineries and Chemical Plants. 6/15/94.  |  | Note: Other applicable performance standards appear on Table I (2 of 2) for the source category of "Fugitive Emissions of VOCs from Chemical Plants" |  |
| Leak Definitions:              |           | Conc. of total organic compounds, including methane, measured above background, expressed as methane and measured 1 cm or less from leak source; EPA Ref. Method 21 "Method 21". |  | Conc. of total organic compounds, including methane, measured above background, expressed as methane and measured 1 cm or less from leak source; EPA Ref. Method 21 "Method 21". |  |  |  |
| Major Gas Leak Definitions:    |           | > 100 ppm (valves, connectors)<br>> 500 ppm (pumps & compressors, pressure relief devices)   |  | > 10,000 ppm   |  |  |  |
| Minor Gas Leak Definitions:    |           | Same as Major  |  | > 10,000 ppm   |  |  |  |
| Major Liquid Leak Definitions: |           | Dripping of total organic compounds (TOC) at rate > 3 drops/min. and a conc. of TOC > applicable leak standard (gas leak definitions)  |  |  |  |  |  |

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| Minor Liquid Leak Definitions:   |           | Same as major   |   |  |  |  |  |
| <b>A. Leak Control Requirements</b>  | VOC       |   |   |  |  |  |  |
| A1. <u>Gas leaks allowed (&lt;200 components):</u><br>- Valves (V)<br>- Pumps seals (P)<br>- Compressors seals (Cp)<br>- Pressure Relief Valves (PRV)<br>- Hatches<br>- Open ended lines (OEL)<br>- Other components |           | N/A   | N/A   |  |  |  |  |

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| A2. <u>Gas leaks allowed (&gt;200 components):</u><br>- Valves (V)<br>- Pumps seals (P)<br>- Compressors seals (Cp)<br>- Pressure Relief Valves (PRV)<br>- Hatches<br>- Open ended lines (OEL)<br>- Other components |           |   | N/A             |   | N/A             |  |  |
| <b>B. Components ID</b>  | VOC       |   | Yes             |   | Yes             |  |  |
| <u>B1. All components physically identified:</u>   |           |   | - not specified |   | - not specified |  |  |
| <u>B2. Components identified on flow diagrams:</u>   |           |   | - No            |   | - No            |  |  |

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| <b>C. Operators Inspection Requirements</b>  |           |   |   |   |                   |  |  |
| <u>C1. Audio-visual insp.</u>  |           |   | - Daily (pumps & compressors) If leak observed, determine VOC concentration.                            |   | - None specified. |  |  |
| <u>C2. Hydrocarbon analyzer Monitoring (Method 21) - Accessible components:</u>              |           |   | - Quarterly (valves, pressure relief devices, pumps & compressors)                                      |   | - Quarterly       |  |  |
| <u>C2. Hydrocarbon analyzer Monitoring (Method 21) - Threaded Connections &amp; Flanges:</u> |           |   | - <u>For connectors opened during a turnaround,</u> inspect within 90 days after start-up is completed. |   | N/A               |  |  |

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| <u>C2. Hydrocarbon analyzer Monitoring (Method 21) - Inaccessible components:</u>                            |           |   | - Yearly (valves, pressure relief devices) (Note: PRDs equipped with weephole shall be inspected quarterly at outlet of weephole if horn outlet is inaccessible.) |   | - None specified    |  |  |
| <u>C2. Hydrocarbon analyzer Monitoring (Method 21) - Unsafe to monitor components:</u>                       |           |   | - Nothing specified   |   | - Nothing specified |  |  |
| <u>C2. Hydrocarbon analyzer Monitoring (Method 21) - PRV after a pressure relief:</u>                        |           |   | - 5 working days  |   | - Nothing specified |  |  |
| <u>C2. Hydrocarbon analyzer Monitoring (Method 21) - Monitoring frequency extended for good performance:</u> |           |   | - Annually (valves) If<br>1)leak free for 5 consecutive quarters;<br>2)approval from APCO.  |   | - Nothing specified |  |  |

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| C3. <u>Tag all leaks detected.</u>                             |           | Yes - use brightly colored weatherproof tags showing date of leak detection.  | Yes - use brightly colored weatherproof tags showing date of leak detection.  |  |  |  |  |
| D. Maintenance Requirements                                    |           |   |   |  |  |  |  |
| D1. <u>Non-Essential Components - Repair Gas Leaks Within:</u> |           | <u>Valves, Connectors, Pumps &amp; Compressors:</u><br>- minimize within 24 hours.<br>- repair within 7 days, 24 hours if discovered by APCO.<br><br><u>Pressure Relief Devices:</u><br>- minimize within 24 hours.<br>- repair within 15 days, 7 days if discovered by APCO. | - repair within 15 days.  |  |  |  |  |

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| <u>D1. Non-Essential Components - Repair Gas Leaks &gt; 50,000 ppmv Within:</u> |           |   |   |  |  |  |  |
| <u>D1. Non-Essential Components - Repair Major Liquid Leaks Within:</u>         |           | - minimize within 24 hours and repair within 7 days.                    |   |  |  |  |  |
| <u>D1. Non-Essential Components - Repair Minor Liquid Leaks Within:</u>         |           | - minimize within 24 hours and repair within 7 days.                    |   |  |  |  |  |



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| D2. <u>Essential Components - Minimized Leaks Within:</u> |           | <p>- Within 24 hours.</p> <p><u>For Non-Repairable Valves, Pressure Relief Devices, Pumps or Compressors:</u></p> <p>1) repair or replace within 5 years or at next scheduled turnaround, whichever first.</p> <p>2) number awaiting repair not to exceed:<br/>0.5% (valves) or 1% (pressure relief devices, pumps &amp; compressors) of total number of non-repairable equipment allowed or 1 piece of equipment.</p> <p><u>Alternative to 2):</u></p> <p>- Measure for mass emissions within 7 days after leak discovered. Mass emission measurement must be less than: 0.1 lb/day (valves), 0.2 lb/day (PRDs, pumps &amp; compressors)</p> | - minimize within 15 days and repair at next scheduled turnaround.  |  |  |  |  |

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|                     |           | <ul style="list-style-type: none"> <li>- Facility total # awaiting repair not to exceed: 1% (valves), 5% (PRDs, pumps &amp; compressors).</li> <li>- If any component measurement is &gt; 15 lb/day TOC, repair within 7 days.</li> </ul> (Note: This implies that measurements between 15 lb/day and the mass emission standards above must use method 2).) |   |  |  |  |  |

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| <u>D2. Chronic Leakers:</u>   |           |   |  |   |  |  |  |
| <u>D2. OEL and V Located at End of Lines:</u>                               |           |   |  |   |  |  |  |
| <u>D2. Hatches:</u>   |           |   |  |   |  |  |  |
| <u>D3. Components inspected after repair or replacement with Method 21:</u> |           | - Within 24 hours   |  | - None specified.   |  |  |  |

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| <u>D4. Operator management plan:</u> |           |   | N/A |   | N/A |  |  |  |  |
|                                      |           |   |     |   |     |  |  |  |  |
|                                      |           |   |     |   |     |  |  |  |  |

**Table II**  
**Identification of Performance Standards**  
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| Rule/Measure |  |  |  |  |
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|              | BAAQMD Regulation 8-Organic Compounds, Rule 18-Equipment Leaks. 1/7/98.  | BAAQMD Regulation 8-Organic Compounds, Rule 28-Pressure Relief Valves at Petroleum Refinery and Chemical Plants, Bulk Plants and Bulk Terminals. 6/1/94  | Note : Other applicable performance standards appear on Table II (2 of 2) for the source category of "Fugitive Emissions of VOCs from Chemical Plants" |  |
| Exemptions   | <u>Visual Inspection Exemption:</u><br>- not apply to days when facility not staffed.<br><br><u>Inspection, Identification Exemption:</u><br>- equipment handling organic liquids having initial boiling point > 150 °C (302 °F) | <u>Leak/Repair Standards Exemption:</u><br>- any pressure relief valve on storage tanks.<br>- the static upstream pressure exceeds the setpoint of the pressure relief valve.  |  |  |
|              | <u>Inspection, Identification and Record Keeping Exemption:</u><br>- research and development plants which produce only non-commercial products solely for research and dev. purposes.<br>- equipment in vacuum service.         | <u>Leak/Repair Standards and Inspection Exemption:</u><br>- emissions from the pressure relief valve is vented to a vapor recovery or disposal system that is at least 95% efficient.<br>- the pressure relief valve is protected by a rupture disk. |  |  |

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|              | <p><u>Rule Exemption:</u></p> <ul style="list-style-type: none"> <li>- Controlled seal systems and pressure relief devices vented to vapor recovery or disposal system which reduces emissions of organic compounds from the equipment by 95% or greater (exemption from rule except for provision on the determination of control efficiency).</li> <li>- Small facilities-facilities which have less than 100 valves or less than 10 pumps and compressors (these facilities are subjects to Regulation 8-22).</li> <li>- Bulk plant and terminal loading racks-connections at the interface between loading rack and the vehicle being loaded.</li> <li>- Storage tanks-appurtenances on storage tanks including pressure relief devices, which are subject to Regulation 8, Rule 5 Storage of Organic Liquids.</li> </ul> | <p><u>Rule Exemption:</u></p> <ul style="list-style-type: none"> <li>- pressure relief valves handling only organic liquids with a vapor pressure less than 2.6 mmHg (0.05 psia) at 20 oC (68 oF) or exhibit a 10% evaporation point greater than 150 oC (302 oF) according to appropriate test method.</li> <li>- research or development facilities which produce only non-commercial products for research and development purposes.</li> </ul> |  |  |

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| Applicability | Leaking equipment at petroleum refineries, chemical plants, bulk plants and bulk terminals including but not limited to: valves, connectors, pumps, compressors, pressure relief devices, diaphragms, hatches, sight-glasses, fittings, sampling ports, meters, pipes & vessels.  | Pressure relief valves on any equipment handling organic compounds at petroleum refineries and chemical plants.   |  |  |
| Comments      | <u>Note:</u> Rule 18 - Valves and Connectors at Petroleum Refinery complexes, chemical Plants, Bulk Plants and Bulk Terminals and Rule 25 - Pump and Compressor Seals at Petroleum Refinery, Chemical Plants, Bulk Plants and Bulk Terminals has been consolidated and renamed: <b>Rule 18 - Equipment Leaks, 1/7/98.</b> |   |  |  |

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|              | <u>Definition:</u><br>- Petroleum Refinery: Any facility that processes petroleum products as defined in Standard Industrial Classification Manual as Industry No. 2911, Petroleum Refining.<br>- Chemical Plants: Any facility engaged in producing organic or inorganic and/or manufacturing products by chemical processes. Any facility or operation that has 28 as first digits in their Standard Industrial Classification (SIC) Code as det. from the SIC Manual. May include, but not limited to the manufacture of: industrial inorganic and organic chemicals; plastic and synthetic resins, synthetic rubber, synthetic and other man made fibers; drugs; soap, detergents and cleaning preparations, perfumes, cosmetics and other toilet preparations; paints, varnishes, lacquers, enamels and allied products; agricultural chemicals; safflower and sunflower oil extracts; re-refining. | <u>Definition:</u><br>- Chemical Plant:<br>- Rupture Disc: The thin metal diaphragm held between flanges.<br>- Background:<br>- Inaccessible Pressure Relief Valve: |  |  |